

What is claimed is:

1. A propulsion, braking and steering control assembly for installation on a manually propelled vehicle,

said vehicle comprising a frame, a front steering wheel assembly having at least two pivoting steering wheels having front steering wheel shafts, a rear drive wheel assembly comprising at least one drive wheel mounted for rotation on a rear drive wheel shaft, a single direction engagement apparatus axially mounted on said rear drive wheel shaft for translation of a propulsive force, an anti-rollback apparatus axially mounted on said rear drive wheel shaft and an axially mounted braking disc mounted on said shaft, said front steering and rear drive wheel assemblies supporting said frame and enabling movement of the vehicle, a footrest positioned within said frame above said front steering wheel assembly, said front steering wheel shafts being pivotally attached to the frame below the of said foot rest plate, and a seat constructed and oriented to support an occupant and mounted for limited horizontal sliding on the frame through roller and rail or linear bearing means, and a control assembly, said control assembly comprising:

(a) a control lever assembly which is pivotally mounted to the top of the footrest and which has a plurality of engagement sites which extend along its length, said control lever assembly being connected by a brake actuator to said braking disc ;

(b) a sleeve which is disposed for movement on the exterior of the control lever assembly, said sleeve having a plurality of engagement sites which extend along the length of the sleeve and which may be positioned to overlap one or more of the engagement sites of the control lever assembly;

(c) a force conveyance connector which is affixed at one end to the sleeve and at the other end to said single direction engagement apparatus;

(e) a rotating steering column which extends through and is disposed for movement within the control lever assembly, and which (i) engages and turns one of said front steering wheels through connection by a flexible joint to a front steering wheel shaft, and (ii) which has an engager which may, through movement of the steering column, be

positioned to engage simultaneously an engagement site of both the sleeve and control lever assembly and thereby lock the sleeve at a fixed position along the control lever assembly, wherein,

- (1) an increasing propulsive force is translated from the force conveyance connector through the single direction engagement apparatus to the rear drive wheel shaft by pushing the control lever assembly forward from a vertical position when said steering column has been adjusted to lock the sleeve in a position along the control lever assembly closer to the pivot mounting near footrest,
- (2) pulling the control lever assembly in a backwards direction from a vertical orientation applies a braking force to the drive wheel shaft, and
- (3) the vehicle may be steered through movement of the steering column during propulsion or braking.

2. The control assembly of claim 1, wherein the control lever assembly engagement sites and sleeve engagement sites are grooved apertures and the steering column engager is a pin which extends horizontally from the exterior of the steering column.

3. The control assembly of claim 2, wherein the force conveyance connector is a rigid rod, cable or chain.

4. The control assembly of claim 1, wherein the anti-rollback apparatus comprises a circumferentially apertured disc mounted on the rear drive wheel shaft and wherein said disc is fixed in position by insertion of a locking pin through one of said apertures, said locking pin being mounted for insertion into and retraction from said apertures on a support affixed to the frame.

5. The control assembly of claim 1, further comprising a grip positioned at the top of the outer surface of the sleeve, said grip compressively engaging the outer surface of both the sleeve and control lever assembly to prevent slippage of the sleeve as it moves along the control lever assembly.

6. The control assembly of claim 1, wherein the brake actuator is a hydraulic actuator.

7. A manually propelled vehicle comprising:

a frame, a front steering wheel assembly having at least two pivoting steering wheels having steering wheel shafts, a rear drive wheel assembly comprising at least one drive wheel mounted for rotation on a rear drive wheel shaft, a single direction engagement apparatus axially mounted on said rear drive wheel shaft for translation of a propulsive force, an anti-rollback apparatus axially mounted for engagement on said rear drive wheel shaft, an axially mounted braking disc mounted on said shaft, said front steering and rear drive wheel assemblies supporting said frame and enabling movement of the vehicle, a footrest positioned within said frame above said front steering wheel assembly, said front steering wheel shafts being pivotally attached to the frame below the footrest, and a seat constructed and oriented to support an occupant and mounted for limited horizontal sliding on the frame, an auxiliary braking system actuated by sliding the seat along the frame, said auxiliary braking system comprising a lever pivotally mounted on the frame which is flexibly engaged to the bottom of the seat such that forward movement of the seat along the frame causes the lever to pivot and engage or disengage contact between braking pads rotationally mounted on the bottom of the lever and the rear drive wheel, and a control assembly, said control assembly comprising:

(a) a control lever assembly which is pivotally mounted to the frame near the footrest and which has a plurality of engagement sites which extend along its length, said control lever assembly being connected by a brake actuator to a rear drive wheel braking mechanism that engages the rear drive wheel shaft for braking ;

(b) a sleeve which is disposed for movement on the exterior of the control lever assembly, said sleeve having a plurality of engagement sites which extend along the length of the sleeve and which may be positioned to overlap one or more of the engagement sites of the control lever assembly;

(c) a force conveyance connector which is affixed at one end to the sleeve and at the other end to said single direction engagement apparatus;

(e) a rotating steering column which extends through and is disposed for movement within the control lever assembly, and which (i) engages and turns one of said front steering wheels through connection by a flexible joint to said front drive wheel shafts, and (ii) an engager which may, through movement of the steering column, be positioned to engage simultaneously an engagement site of both the sleeve and control lever assembly and thereby lock the sleeve at a fixed position along the control lever assembly wherein,

(1) an increasing propulsive force is translated from the force conveyance connector through the single direction engagement apparatus to the rear drive wheel shaft by pushing the control lever assembly forward from a vertical position when said steering column has been adjusted to lock the sleeve in a position along the control lever assembly closer to the pivot mounting near the footrest,

(2) pulling the control lever assembly in a backwards direction from a vertical orientation applies a braking force to the drive wheel shaft, and

(3) the vehicle may be steered through movement of the steering column during propulsion or braking.

8. The vehicle of claim 7, wherein the vehicle is a wheelchair, the control lever assembly engagement sites and sleeve engagement sites are grooved apertures, the seat is affixed to the frame by wheels fastened on the bottom of the seat, said wheels being mounted for horizontal movement along tracks on the top of said frame, the steering column engager is a pin which extends horizontally from the exterior of the steering column and the single direction engagement apparatus is a single direction rotating disc having a clutch and claw affixed to the disc outer face, said clutch being axially mounted for engagement with said rear drive wheel shaft, said claw engaging said claw to ensure single direction rotation by said disc.

9. The vehicle of claim 8, wherein the force conveyance connector is a cable, wire, chain or rigid rod.

10. The vehicle of claim 9, wherein the anti-rollback apparatus comprises a circumferentially apertured disc mounted on the rear drive wheel shaft, said disc being fixed in position by insertion of a locking pin through one of said apertures, said locking pin being mounted for insertion into and retraction from said apertures by means of a support affixed to the frame.

11. The vehicle of claim 10, wherein the control assembly further comprising a grip positioned at the top of the outer surface of the sleeve, said grip compressively engaging the outer surface of both the sleeve and hand control lever assembly to prevent slippage of the sleeve as it moves along the hand control lever assembly.

12. The vehicle of claim 10, further comprising a system for selectively engaging and disengaging the anti-rollback apparatus and the single direction engagement disc, said system comprising:

(a) a disengagement handle pivotally mounted on said frame at a position convenient for engagement by a vehicle occupant, said handle being locked in a vertical position relative to said frame when not in use by a locking tab mounted on the frame, said disengagement handle also being connected to the frame by a spring connected to the bottom of the handle ;

(b) a disengagement cable connected at one end to the bottom of the disengagement handle and splitting at its other end to connect to two fasteners, the first of which is adapted to disengage and engage contact between the claw and the clutch, and the second of which is adapted to disengage and engage contact between the locking pin and an aperture in the anti-rollback apparatus,

wherein, upon disengagement of the disengagement handle from the locking tab, the handle may be pulled back to pull the disengagement cable and thereby disengage contact

between the claw and the clutch and disengage and engage contact between the locking pin and an aperture in the anti-rollback apparatus.

13. A manually propelled vehicle comprising:

a frame, a front steering wheel assembly having at least two pivoting steering wheels having steering wheel shafts, a rear drive wheel assembly comprising at least one drive wheel mounted for rotation on a rear drive wheel shaft, a single direction engagement apparatus axially mounted on said rear drive wheel shaft for translation of a propulsive force, an anti-rollback apparatus axially mounted for engagement on said rear drive wheel shaft, an axially mounted braking disc mounted on said shaft, said front steering and rear drive wheel assemblies supporting said frame and enabling movement of the vehicle, a footrest positioned within said frame above said front steering wheel assembly, said front steering wheel shafts being pivotally attached to the frame below the bottom of said footrest, and a seat constructed and oriented to support an occupant and mounted for limited horizontal sliding on the frame, an auxiliary braking system actuated by sliding the seat along the frame, said auxiliary braking system comprising a hydraulic piston connected to an auxiliary braking disc mounted on the rear drive wheel, said piston actuating the auxiliary braking disc when the seat slides forward, and a control assembly, said control assembly comprising:

- (a) a control lever assembly which is pivotally mounted to the frame near the footrest and which has a plurality of engagement sites which extend along its length, said control lever assembly being connected by a brake actuator to a rear drive wheel braking mechanism that engages the rear drive wheel shaft for braking ;
- (b) a sleeve which is disposed for movement on the exterior of the control lever assembly, said sleeve having a plurality of engagement sites which extend along the length of the sleeve and which may be positioned to overlap one or more of the engagement sites of the control lever assembly;
- (c) a force conveyance connector which is affixed at one end to the sleeve and at the other end to said single direction engagement apparatus;

(e) a rotating steering column which extends through and is disposed for movement within the control lever assembly, and which (i) engages and turns one of said front steering wheels through connection by a flexible joint to said front drive wheel shafts, and (ii) an engager which may, through movement of the steering column, be positioned to engage simultaneously an engagement site of both the sleeve and control lever assembly and thereby lock the sleeve at a fixed position along the control lever assembly wherein,

(1) an increasing propulsive force is translated from the force conveyance connector through the single direction engagement apparatus to the rear drive wheel shaft by pushing the control lever assembly forward from a vertical position when said steering column has been adjusted to lock the sleeve in a position along the control lever assembly closer to the pivot mounting near the footrest,

(2) pulling the control lever assembly in a backwards direction from a vertical orientation applies a braking force to the drive wheel shaft, and

(3) the vehicle may be steered through movement of the steering column during propulsion or braking.

14. A manually propelled vehicle comprising:

a frame, a front steering wheel assembly having at least two pivoting steering wheels having steering wheel shafts, a rear drive wheel assembly comprising at least one drive wheel mounted for rotation on a rear drive wheel shaft, a single direction engagement apparatus axially mounted on said rear drive wheel shaft for translation of a propulsive force, an anti-rollback apparatus axially mounted for engagement on said rear drive wheel shaft, an axially mounted braking disc mounted on said shaft, said front steering and rear drive wheel assemblies supporting said frame and enabling movement of the vehicle, a footrest positioned horizontally within said frame above said front steering wheel assembly, said front steering wheel shafts being pivotally attached to the frame below the said footrest, and a seat constructed and oriented to support an occupant and mounted for limited horizontal sliding on the frame, said vehicle further comprising

(a) auxiliary braking system which applies a braking force to the rear drive wheel shaft, said auxiliary braking system being actuated when the seat slides forward along the frame,

(b) a control assembly mounted on the frame near the footrest for propulsion, braking and steering, said control assembly (i) conveying a propulsive force to the rear drive wheel shaft when pushed forward, (ii) conveying a braking force to the rear drive wheel shaft when pulled back, and (iii) being engaged for steering to a steering wheel shaft, and

(c) an anti-rollback disengagement system mounted on the frame or the control assembly for selective disengagement of the single direction engagement apparatus and anti-rollback apparatus.

15. The vehicle of claim 14, wherein the vehicle is a wheelchair and the auxiliary braking system anti-rollback disengagement system are hydraulically activated.

16. The vehicle of claim 14, wherein the vehicle is a wheelchair, the auxiliary braking system is hydraulically activated and the force conveyance connector is a cable, wire, chain or rigid rod.

17. The vehicle of claim 14, wherein the vehicle is a wheelchair, the auxiliary braking means comprise a lever connected to the seat, said lever having braking pads at its bottom end for engagement with a rear drive wheel, and the control assembly means includes a cable force conveyance connector.

18. The vehicles of claim 14, wherein the control assembly comprises:

(a) a control lever assembly which is pivotally mounted to the top of the footrest and which has a plurality of engagement sites which extend along its length, said control lever assembly being connected by a brake actuator to said braking disc ;

(b) a sleeve which is disposed for movement on the exterior of the control lever assembly, said sleeve having a plurality of engagement sites which extend along the length of the sleeve and which may be positioned to overlap one or more of the engagement sites of the control lever assembly;



(c) a force conveyance connector which is affixed at one end to the sleeve and at the other end to said single direction engagement apparatus;

(e) a rotating steering column which extends through and is disposed for movement within the control lever assembly, and which (i) engages and turns one of said front steering wheels through connection by a flexible joint to a front steering wheel shaft, and (ii) which has an engager which may, through movement of the steering column, be positioned to engage simultaneously an engagement site of both the sleeve and control lever assembly and thereby lock the sleeve at a fixed position along the control lever assembly, wherein,

(1) an increasing propulsive force is translated from the force conveyance connector through the single direction engagement apparatus to the rear drive wheel shaft by pushing the control lever assembly forward from a vertical position when said steering column has been adjusted to lock the sleeve in a position along the control lever assembly closer to the pivot mounting near the footrest,

(2) pulling the control lever assembly in a backwards direction from a vertical orientation applies a braking force to the drive wheel shaft, and

(3) the vehicle may be steered through movement of the steering column during propulsion or braking.

19. The vehicles of claim 18, wherein:

(a) the single direction engagement apparatus is a single direction rotating disc having a clutch and claw affixed to the disc outer face, said clutch being axially mounted for engagement with said rear drive wheel shaft, said claw engaging said claw to ensure single direction rotation by said disc; and

(b) the anti-rollback apparatus comprises a circumferentially apertured disc mounted on the rear drive wheel shaft and wherein said disc is fixed in position by insertion of a locking pin through one of said apertures, said locking pin being mounted for insertion into and retraction from said apertures on a support affixed to the frame.